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Steiner symmetrization on the sphere

Steiner symmetrization is an important tool to solve geometric extremum problems in Euclidean space. The aim of this talk is to introduce a generalization of Steiner symmetrization in Euclidean space for spherical space, which is the dual of the Steiner symmetrization in hyperbolic space introduced by Peyerimhoff in 2002. We show that this symmetrization preserves volume in every dimension, and investigate when it preserves convexity. In addition, we examine the monotonicity properties of the perimeter and diameter of a set under this process, and find conditions under which the image of a spherically convex disk under a suitable sequence of Steiner symmetrizations converges to a spherical cap. We talk about applications of our method to prove a spherical analogue of a theorem of Sas, and to confirm a conjecture of Besau and Werner about spherical floating bodies for centrally symmetric spherically convex disks. We also describe a spherical variant of a theorem of Winternitz. Joint work with Bushra Basit, Steven Hoehner and Jeff Ledford.